NIMBioS

National Institute for Mathematical and Biological Synthesis

NIMBioS Interdisciplinary Seminar
3:30 p.m.*, Thursday, April 18, 2013

Dr. Chris Remien
NIMBioS Postdoctoral Fellow

"Modeling biological markers: Acetaminophen and stable isotope dynamics"

Indirect measurements are ubiquitous in the sciences because it is often impossible or impractical to directly measure the process of interest. I will show how dynamic mathematical models of biological markers can aid interpretation in two such cases: acetaminophen overdose liver injury markers and stable isotope signatures. Acetaminophen (APAP) is one of the most common drugs on the planet. While safe in therapeutic doses, APAP is the leading cause of acute liver failure in the developed world. I will present a dynamic mathematical model of APAP overdose, and show how the model can be used to estimate time since overdose, overdose amount, and outcome from measurable markers of liver injury at the time of hospital admission. Analysis of model dynamics shows that there is a simple threshold with respect to liver damage and APAP intake. The dynamics provide insight into why liver damage from APAP overdose is generally acute even with chronic use. Stable isotope ratios of animal tissues are used by ecologists to estimate diet, movement patterns, and trophic position. Central to these estimates is the characteristic offset of isotope ratio from diet to tissue, which depends on physiology and diet. I will adapt an existing modeling framework to understand how weight loss and gain affect the offset of nitrogen isotope ratio from diet to tissue.

Hallam Auditorium, Room 206, Claxton Education Building, 1122 Volunteer Blvd.
Join us for refreshments at 3 p.m. in the 1st floor visitor breakroom.

For more information about this and other NIMBioS Seminars, visit http://www.nimbios.org/seminars

THE UNIVERSITY of TENNESSEE ut KNOXVILLE

NSF